The hair hygrometer should be standardized at temperatures down to $-40°$ or lower, by comparison with the chemical hygrometer or other apparatus the errors of which should not exceed 10 per cent. Doctor Sverdrup's modified aspiration psychrometer, in which are employed thermopiles reading to 0.001° C., promises to be useful, since it is free from instrumental errors unavoidable when thermometers are used, but the usual precautions regarding management and exposure, etc., will be necessary. The standardization of several instruments should be sufficient to determine the probable errors of hair hygrometers as a class, and thereafter changes of zero or range can be detected by comparisons at temperatures above freezing.

It should be stated, however, that although the extension of this work is most desirable, accumulated experience and the data already at hand indicate clearly that at the present time records of humidity in cold climates could be improved very decidedly by the use of the hair hygrometer when the temperature is low. The relative merits of psychrometers and hair hygrometers under such conditions can best be stated in this way:

(1) The statement of the increase of error of the psychrometer, quoted from several authorities, assumes the use of good instruments under "research" conditions; a probable error of ± 20 per cent at $-20°$ might easily increase to ± 30 per cent or more when instruments with unknown errors are employed by untrained observers.

(2) Hair hygrometers are not appreciably affected by temperatures within the atmospheric range. This is evident from the fact that the same instrument can be used throughout the year without adjustment.

(3) There is no evidence at hand that the error of the hair hygrometer increases at temperatures below freezing; on the contrary, all the data we have supports the probability that it is no larger at very low than at moderate temperatures. It is highly improbable that any element other than moisture can affect hair at low temperatures, and no other has been suggested. One very important advantage possessed by the hair hygrometer—obvious to all—is that, since readings can be made "at sight" before the surrounding air is influenced by the observer's body, the data are not subject to the errors of condition so difficult to avoid when the psychrometer is employed.

Consequently when one of two methods fails (as we know the psychrometer does) and the error of the other is not known to increase at low temperatures, we can not do better than to use the one that will come nearest to yielding the data desired. Even if the data are to an indefinite extent qualitative, the direction of a change of condition is often of more importance than its extent.

As suggested for the aerological stations, two instruments, the hygrograph and a simple, nonrecording instrument (preferably of the single-hair type), could be kept in use at all northern stations and the mean of their readings adopted as the relative humidity at any observation. Under ordinary circumstances, the change of zero (the only serious defect of the hair hygrometers) can be found and corrected by means of comparisons with the psychrometer when the temperature is above freezing, taking care to ventilate both instruments and protect them against artificial heating, etc. Changes of range, obviously, can be detected by the same method when the range of humidity within a short period of time is large; but a more satisfactory method, particularly in winter, when the humidity in heated rooms is low, is that of comparing the instruments at the conditions prevailing in the room and afterwards determining the errors of the hair hygrometers near saturation by covering them with a saturated bath towel. The highest humidity ordinarily attainable by this method in a dry room is about 96 or 97 per cent; but, while we may agree with Napier Shaw in our dislike for a method that does not quite give us the saturation point, we know from experience that a hair hygrometer adjusted to read 96 per cent under a moist cloth will read 100 per cent when the air itself is saturated—and the method is so simple that it can be used by anyone.—*S. P. Fergusson.*

THE EAST WIND AND ITS LIFTING EFFECTS AT FORT SMITH, ARKANSAS

By TRUMAN G. SHIPMAN

[Weather Bureau Office, Fort Smith, Ark., December 16, 1925]

Fort Smith is located in western Arkansas on the banks of the Arkansas River. While it has a continental climate, it is far enough east to escape the severe effects of the "norther" of the western plains and is near enough to the Gulf of Mexico to have its winter temperature moderated by southerly winds. The surrounding topography is the cause of several local features of climate. It is my purpose to discuss them because they have a bearing on local forecasts.

The Arkansas River at Fort Smith flows through a valley which is many miles wide in eastern Oklahoma, but narrows to almost a point 100 miles east of Fort Smith. North of the valley are the Boston Mountains, which extend from northeastern Oklahoma about two-thirds across Arkansas, and reach elevations of about 2,300 feet in Newton County, Ark. The Ozark Plateau, about 40,000 square miles in extent, lies northeast of the valley. South of the valley, a range of hills and mountains, beginning with the Arbuckle and Ouachita Mountains in southeastern Oklahoma, extends eastward to central Arkansas. Peaks in this ridge reach elevations of 2,500 to 3,000 feet, although the average height is less. Thus it is seen that Fort Smith is near the center of the wide end of a V-shaped lowland.

The most striking feature of climate at Fort Smith is the prevailing east wind, which blows 41 per cent of the time. This occurs in a region where north to northwest winds are expected in the winter season and southerly in the summer. The wind is mainly a plateau-valley breeze, although the seasonal low pressure area over the center of the continent in summer is a contributing factor in increasing the percentage at that season. The wind originates on the Ozark Plateau to the northeast; as a result of the more rapid nocturnal cooling there than that which takes place at the lower elevations. It flows thence down the southern slope of the Ozarks and, as it reaches the valley floor, its direction is determined by the trend of the valley. Since the eastern end of the valley has only a narrow outlet, the air flows towards the wider opening in the west, thereby becoming an east wind.

It is the opinion of the writer that this wind is rather shallow, perhaps not more than 1,500 to 2,000 feet in depth; that its depth is the elevation of the plateau above the valley and tapers to nothing about 50 miles west of Fort Smith. The conditions above Fort Smith [1]

[1] U. S. W. B., Bull. F, Report of Kite Observations, 1898, p. 29.

vary from those observed at other stations made during the same year where kite observations were made. The differing conditions appeared at elevations from 1,500 to 2,000 feet and support the above opinion. To quote the bulletin, "The mean decrease in temperature with increase of altitude was 6.1 degrees for each 1,000 feet. The gradient decreased slowly up to 2,000 feet and quite rapidly thereafter, a departure from the conditions prevailing elsewhere." However, kite observations were made in the daytime and differences are undoubtedly more pronounced at night. Quoting Bulletin F further, "The observations were equally divided between the mornings and afternoons, and the means were exactly equal. The gradients also differed but little up to the different altitudes, except at 1,000 feet, where the morning one was 2.6 degrees larger." Also, "The clear and cloudy weather gradients were exactly alike up to 2,000 feet; up to 1,500 feet, the cloudy was 1.2 degrees larger than the clear one, while up to the remaining altitudes, the clear weather ones were the greater."

Fort Smith lies in a region of considerable atmospheric instability. Thunderstorms occur here when they appear at no other place on the weather map. False cirri are sometimes observed near the base of the overflowing current. Occasionally cumulus or cumulo-nimbus bases are observed moving in a different direction from which the summits are moving.

A tabulation to determine the exact percentage of nighttime east winds and daytime east winds has not been made, nevertheless, an inspection of the prevailing hourly directions recorded in the Climatological Record, and of several individual monthly records of prevailing hourly wind direction, supports the conclusion that the percentage of east winds at night averages over 50 most of the year. Since the east wind is cool, it flows close to the surface of the earth. Thus while it prevails it lifts other winds which are passing over the valley. This lifting tendency has an important bearing on forecasts for precipitation and temperature made for Fort Smith and adjacent territory.

It is a cause of delayed temperature effects at Fort Smith, as well as of the reduced number of cold waves. Frequently during the first day of a cold wave in the surrounding country, the cold is still 1,000 to 2,000 feet above Fort Smith unless the westerly wind is strong enough to displace the easterly. The coldest weather in sudden drops of temperature at Fort Smith usually comes on the second morning, or at the time the center of the cold area lies northeast of Fort Smith, in such a position that the anticyclonic outflow coincides with the predominating easterly wind, which then carries the cold into the valley. Northwest Arkansas had 31 cold waves in 10 years [2] while Fort Smith had but 19. Temperatures in cold waves are several degrees colder a short distance west of Fort Smith in Oklahoma because the lifting effects of the easterly wind is not operative there.

The overcoming influence of westerly winds is apparent in the increase of percentages of winds from westerly directions as the average velocities for these directions increase. (See Tables 1 and 2.)

TABLE 1.—*Average percentage of hours of wind movement from each direction, Fort Smith, Ark., 7-year period, 1918–1924*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
North	8.1	11.6	10.0	5.9	7.6	5.4	7.4	5.1	10.1	8.1	9.1	7.0	8.0
Northeast	6.0	5.0	4.6	5.6	7.1	6.8	8.0	6.7	10.3	8.7	6.7	5.1	6.7
East	42.7	33.0	38.4	39.0	38.9	40.6	41.7	46.4	45.0	50.6	38.4	38.9	41.1
Southeast	2.9	3.1	6.6	7.3	10.3	10.9	7.8	7.2	9.1	6.3	3.7	1.9	6.4
South	4.6	6.3	11.6	11.7	11.7	15.0	11.5	12.7	10.1	6.4	5.8	5.0	9.4
Southwest	13.4	14.9	9.1	11.3	10.1	11.6	12.6	14.4	7.8	7.4	15.5	17.9	12.1
West	8.9	10.6	6.9	9.1	5.6	4.6	5.4	3.8	2.9	4.8	9.0	8.9	6.7
Northwest	13.4	15.4	12.9	10.1	8.4	4.9	5.1	3.5	4.9	8.0	11.5	15.1	9.4

TABLE 2.—*Average hourly wind velocity, miles per hour, from each direction, Fort Smith, Ark., 7-year period, 1918–1924*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
North	6.7	8.4	8.1	6.9	6.4	5.6	5.5	6.1	6.6	6.4	6.9	8.8	6.9
Northeast	4.7	5.4	5.6	5.5	4.6	4.2	4.1	4.4	4.3	4.1	4.2	5.3	4.7
East	8.9	9.5	9.1	9.6	7.9	6.5	6.0	6.4	6.5	7.3	8.0	8.9	7.9
Southeast	6.3	8.0	9.7	9.7	7.7	6.1	5.8	6.2	6.8	7.8	7.2	5.8	7.3
South	8.0	9.8	10.8	10.5	9.4	8.1	7.4	7.3	8.3	9.8	9.4	9.3	9.0
Southwest	7.2	8.7	10.8	10.5	7.3	7.9	6.4	6.8	6.9	7.7	7.0	8.4	8.0
West	9.9	11.6	12.9	12.6	7.8	6.3	5.4	5.2	5.6	6.9	9.0	10.1	8.6
Northwest	10.0	9.8	11.5	11.2	9.4	6.3	5.7	6.1	6.8	7.7	9.2	10.3	8.7

Another lifting tendency effect of the east wind is apparent when we study the hourly precipitation for Fort Smith (Table 3). The principal maximum of hourly precipitation for the year, at 10:00 p. m., local standard time, is caused by the lifting of the warm, moisture-laden valley air by the underflowing easterly current which has started as soon after sunset as the more rapid nocturnal cooling on the plateau has become effective. An inspection of the summations by seasons in Table 3 shows that this lifting is effective at all seasons; although it is the least effective in summer. In this season daytime convectional rains exceed in amount rains due to lifting; and, furthermore, the atmospheric moisture is probably reduced by convection to such a point that the lifting influence is not effective in producing precipitation when the valley breeze begins.

[2] W. B. No. 583, Weather Forecasting in the United States, p. 148.

TABLE 3.—*Hourly occurrences and hourly totals of precipitation, Fort Smith, Ark., 1904–1923, inclusive*

	A. M.												P. M.											
	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midnight
December																								
Occurrences	47	49	52	50	57	57	70	80	83	78	79	84	83	70	74	75	69	69	68	66	69	67	60	50
Hourly totals	2.08	2.22	2.16	2.50	2.08	1.76	1.45	1.69	2.49	2.07	2.02	1.41	1.60	1.88	1.41	1.75	2.55	1.85	1.21	1.38	2.47	2.34	1.81	1.23
January																								
Occurrences	42	46	43	48	61	65	80	86	86	80	75	76	78	76	68	68	67	71	70	82	77	80	67	52
Hourly totals	2.49	1.65	1.56	1.81	2.25	2.02	2.52	2.59	2.80	2.10	2.11	1.73	2.08	2.19	2.22	2.46	2.49	1.79	1.90	1.60	2.00	2.43	2.10	3.09
February																								
Occurrences	44	46	47	44	47	45	56	65	69	71	63	58	51	56	61	55	65	64	72	67	64	62	54	53
Hourly totals	1.82	1.08	1.46	1.81	1.24	1.40	1.28	1.95	1.97	1.58	1.07	1.38	1.34	1.28	0.81	1.31	2.44	2.27	2.21	1.66	2.13	2.55	2.10	2.45
WINTER TOTALS																								
Occurrences	133	141	142	142	155	167	206	231	238	229	217	218	212	202	203	198	201	204	210	215	210	209	181	155
Hourly totals	6.39	4.95	5.18	6.12	5.57	5.18	5.25	6.23	7.26	5.75	5.20	4.52	5.02	5.35	4.44	5.52	7.48	5.91	5.32	4.64	6.60	7.32	6.01	6.77
March																								
Occurrences	51	46	51	51	53	59	68	78	70	56	57	62	64	62	60	56	60	61	64	71	68	67	61	61
Hourly totals	2.82	2.25	1.97	1.89	1.78	1.82	2.26	1.61	1.73	2.11	1.85	1.43	1.77	2.13	2.15	2.94	2.38	2.96	1.82	1.93	2.16	2.73	2.84	2.57
April																								
Occurrences	45	51	52	53	57	60	80	80	71	66	71	69	74	72	67	70	67	59	66	63	65	70	59	48
Hourly totals	3.19	2.81	2.89	2.13	3.21	3.31	3.14	2.98	3.06	2.29	3.04	3.15	2.51	2.84	2.68	4.35	3.36	3.44	2.05	2.32	2.05	4.51	3.48	2.50
May																								
Occurrences	53	57	55	61	60	58	70	70	58	55	59	63	65	56	60	56	71	60	58	70	62	67	65	51
Hourly totals	3.69	3.18	4.67	4.52	2.96	3.15	3.40	2.22	2.61	2.24	4.48	3.49	2.98	3.38	3.45	3.82	5.14	3.49	4.24	2.83	3.49	5.71	6.21	4.70
SPRING TOTALS																								
Occurrences	149	154	158	165	170	177	218	228	199	177	187	194	203	190	187	152	198	180	188	204	195	204	185	160
Hourly totals	9.60	8.24	9.53	8.54	7.95	8.28	8.80	6.81	7.40	6.64	9.37	8.07	7.26	8.35	8.28	11.11	10.88	9.89	8.01	7.08	7.70	12.95	12.53	9,77
June																								
Occurrences	26	30	34	35	32	42	50	52	52	47	46	50	58	54	40	39	52	52	56	58	44	30	25	20
Hourly totals	4.21	1.96	2.76	3.64	4.50	2.80	3.33	2.53	3.21	4.61	2.76	2.91	4.67	2.84	3.64	1.98	2.56	2.55	3.91	2.26	1.26	0.83	1.48	0.99
July																								
Occurrences	24	20	24	33	31	30	34	41	44	39	38	36	36	38	40	52	52	49	32	38	34	27	19	21
Hourly totals	1.29	3.53	2.30	2.12	1.94	2.48	2.85	3.87	2.67	2.24	2.51	1.89	1.09	2.39	4.25	3.29	3.08	4.42	1.96	2.25	2.69	2.18	1.48	1.31
August																								
Occurrences	21	20	28	34	35	51	61	56	48	44	43	45	47	39	48	55	47	52	48	43	36	27	21	21
Hourly totals	3.00	1.71	2.61	3.25	4.14	4.06	3.44	3.62	3.15	2.97	1.94	1.44	1.85	1.51	3.43	5.30	3.23	1.51	1.46	1.67	1.33	3.48	1.48	3.87
SUMMER TOTALS																								
Occurrences	71	70	86	102	98	123	145	149	144	130	127	131	141	131	128	146	151	153	136	139	114	84	65	62
Hourly totals	8.50	7.20	7.67	9.01	10.58	9.34	9.62	10.02	9.03	9.82	7.21	6.24	7.61	6.74	11.32	10.57	8.87	8.48	7.33	6.18	5.28	6.49	4.44	6.17
September																								
Occurrences	22	26	26	33	39	42	54	56	52	52	56	46	47	47	48	46	36	40	30	26	31	39	39	25
Hourly totals	1.55	0.58	1.73	2.67	2.97	2.58	2.13	1.50	2.11	3.25	2.97	2.14	1.91	1.71	2.93	1.27	2.55	1.68	1.95	1.40	1.56	4.08	2.80	1.40
October																								
Occurrences	33	35	41	41	44	51	51	53	44	48	48	46	52	46	46	50	45	39	48	52	48	45	44	41
Hourly totals	0.99	2.84	2.90	2.11	3.54	2.46	3.24	2.23	1.62	2.31	2.44	1.96	1.82	1.13	2.40	2.34	2.84	3.26	1.86	1.73	2.22	2.29	1.90	1.56
November																								
Occurrences	38	43	42	46	46	56	61	58	69	62	63	54	52	48	51	46	43	41	48	55	46	44	46	40
Hourly totals	2.89	2.25	2.54	2.41	1.91	1.94	1.24	1.30	1.47	2.18	1.68	2.36	2.55	2.70	2.14	2.36	1.29	1.42	1.75	1.31	2.29	2.32	2.06	2.04
AUTUMN TOTALS																								
Occurrences	93	104	109	120	129	149	166	167	165	158	167	146	151	141	145	142	124	120	126	133	125	128	129	106
Hourly totals	5.43	5.67	7.15	7.19	8.42	6.98	6.61	5.03	5.20	7.74	7.09	6.46	6.28	5.54	7.47	5.97	6.68	6.36	5.56	4.44	6.07	8.69	6.76	5.00
ANNUAL TOTALS																								
Occurrences	446	469	495	529	552	616	735	775	746	694	698	689	707	664	663	668	674	657	660	691	644	625	560	483
Hourly totals	29.92	26.06	29.53	30.86	32.52	29.78	30.28	28.09	28.89	29.95	28.87	25.29	26.17	25.98	31.51	33.17	33.91	30.64	26.22	22.34	25.65	35.45	29.74	27.71

There are for the year as a whole, three maxima of hourly precipitation at Fort Smith; the principal one at 10 p. m. has been discussed above. The one at 5 p. m. is due to rain caused by convection and the effects are more pronounced in the values for spring and summer. Since lowering the temperature of a volume of air reduces its capacity for moisture, increases its relative humidity, and, if carried far enough will produce condensation and precipitation, an increase in the hourly amounts of precipitation would be expected at the time of the daily minimum temperature, due to nocturnal cooling. Such a maximum appears in the tables under discussion at 5 a. m. However it is the least of the maxima.

The three causes of precipitation discussed are not often operative on the same day at Fort Smith. Any one of them operating any length of time is likely to deprive the air of available moisture. When one has operated, or is operating, it is unlikely that the others will become effective soon with any degree of frequency. In summer, when thunderstorms occur and convection has taken place late in the afternoon, it is most unlikely that any precipitation will occur at night as a result of the lifting tendency, since the atmospheric moisture has been greatly reduced. This is evidenced by the high 3 p. m. totals on the sums for June, July, and August, the season when thunderstorms are most frequent and the lower totals at 10 p. m. when the lifting process should be active. On the other hand, if the time for the convective rains passes, without precipitation and the air is moisture laden, the lifting tendency is almost certain to produce precipitation as soon as the cool air sinks to the valley and lifts the moist air.

The totals for autumn, winter, and spring show slightly increased values at 10 p. m., when the lifting process is active, over the values late in the afternoon when convection is predominant.

The minimum at 12 noon is the result of increased capacity of air for moisture caused by diurnal warming, and occurs before convection begins to produce precipitation. The primary minimum in the tables for the year at 8 p. m. represents a lull between the average time of greatest convection and the average time of greatest lifting effect in producing precipitation. It can not be attributed directly to any physical process, but rather to the absence of any physical causes of precipitation. That this minimum should occur between the primary and secondary maxima is striking, especially when the maxima are only five hours apart. The rapid rises to both maxima and the rapid returns to both minima are indicative of the sudden effectiveness of convection and of the lifting effect in causing precipitation and of relieving the air of available moisture. An inspection of curves drawn from values in the tables leads to the conclusion that it requires about two hours for the lifting process to become effective here.

An added proof that lifting of warm air as described above is an important physical process in producing precipitation is found in the monthly and annual totals of precipitation at cooperative stations located on the southern edge of the Ozark Plateau.[3] These stations show increased values at points where this process is first operative.

The hourly occurrences of precipitation (Table 3), regardless of amount, show a maximum at 8 a. m. and a minimum at 1 a. m. The lack of eye observations at night may play a small part in causing the minimum at night, but that is not the only cause. The season with the largest number of hours with precipitation, winter, is also the season with the least amount of precipitation as shown by the hourly totals. It proves that the processes at work during the warm season are more effective in producing rainfall than the processes active during the cold season are.

[3] Climatological Data for United States by sections, secs. 47 and 48, 1917 Ed.

THE WEATHER OF 1925 IN THE UNITED STATES

By ALFRED J. HENRY

Temperature.—As a whole, the year must be classed as a warm one, thus completing a series of five consecutive warm years beginning with 1921. February, March, and April, 1925, were warm, from 3 to 5 degrees above the average; no abnormally cool weather occurred until October, that month being unusually cool in the Missouri and upper Mississippi Valleys and in parts of the Plains States. October was also characterized by the occurrence of rather early and heavy snow in the northern Rocky Mountain region. December was warm until the close of the month, when a cold spell reached the Gulf region.

The geographic distribution of the temperature abnormality is shown in Figure 1, and the monthly departure from the normal for geographic districts is presented in Table 1.

TABLE 1.—*Temperature departures, 1925*

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.	Average monthly departure
New England	−2.7	+7.5	+5.7	+1.9	−1.6	+2.9	−1.1	+0.3	−0.3	−5.7	+0.4	+0.2	+0.6
Middle Atlantic	−0.9	+7.2	+4.1	+2.7	−3.0	+4.4	−0.3	−0.9	+3.3	−3.5	−0.9	−0.1	+0.8
South Atlantic	+0.6	+5.2	+2.8	+2.9	−2.3	+2.5	+1.8	+0.6	+7.0	−0.4	−1.9	−1.4	+1.4
Florida peninsula	+5.4	+1.2	+0.1	−0.8	−1.4	+0.2	+0.4	+0.4	+1.4	+2.3	+0.4	+0.1	+0.8
East Gulf	+1.6	+3.9	+2.3	+4.3	−1.3	+2.2	+0.9	+1.1	+7.9	+0.1	−1.4	−2.5	+1.6
West Gulf	−1.1	+5.9	+3.8	+5.0	0.0	+3.3	+1.6	+1.0	+4.0	−2.6	−0.5	−4.0	+1.4
Ohio Valley and Tennessee	+0.7	+6.5	+3.1	+4.9	−4.2	+3.7	−0.2	+0.8	+7.2	−6.3	−1.4	−2.9	+1.0
Lower Lakes	−2.9	+6.7	+4.4	+3.0	−4.8	+2.7	−2.1	+0.5	+1.8	−8.3	−0.8	−1.7	−0.1
Upper Lakes	−0.6	+4.0	+3.0	+4.5	−3.2	+1.8	−1.3	+2.3	+2.1	−8.7	−1.1	−2.6	0.0
North Dakota	+5.0	+8.7	+6.3	+8.0	0.0	−0.9	−1.3	+2.7	+1.0	−9.6	+2.5	+4.3	+2.2
Upper Mississippi Valley	+1.4	+6.1	+4.8	+6.8	−3.2	+1.7	−0.6	+1.1	+5.3	−10.2	−1.0	−3.7	+0.7
Missouri Valley	0.0	+7.4	+6.1	+7.6	−1.4	+2.1	+0.5	+2.1	+4.6	−10.4	+1.0	−0.3	+1.6
Northern slope	+3.3	+10.1	+4.5	+4.4	+2.1	+0.6	+2.0	+0.1	0.0	−8.8	+1.2	+4.5	+2.0
Middle slope	−2.1	+7.5	+5.7	+5.8	+1.0	+4.4	+1.5	−0.1	+2.4	−8.4	+0.2	+0.4	+1.5
Southern slope	−1.9	+6.6	+5.0	+5.1	0.0	+2.5	+1.4	−1.2	+0.2	−4.3	−0.4	−3.8	+0.8
Southern plateau	−1.1	+3.6	+3.3	+3.0	+3.6	+0.5	+1.5	−1.4	−0.4	−0.7	−1.1	−1.1	+0.8
Middle plateau	−1.2	+5.4	+2.0	+2.2	+5.1	−0.2	+3.0	−2.1	−1.8	−0.7	−0.6	+3.0	+1.2
Northern plateau	+4.7	+8.3	+2.2	+3.0	+3.9	+2.1	+5.1	0.0	+0.5	−1.0	−0.3	+4.1	+2.7
North Pacific coast region	+3.1	+3.9	+0.6	+1.8	+3.3	+0.9	+1.7	−0.1	+1.2	+0.7	+0.8	+3.4	+1.8
Middle Pacific coast region	+0.8	+2.7	+0.7	+0.8	+1.0	+1.5	+1.6	−0.6	−0.9	+0.5	−0.3	+1.3	+0.8
South Pacific coast region	+1.8	+2.6	+0.9	+0.5	+1.4	+0.9	+2.2	−1.0	−1.2	−0.4	+0.8	+3.9	+1.0
United States	+0.7	+5.8	+3.4	+3.7	−0.2	+1.8	+0.9	+0.3	+2.2	−4.2	−0.2	+0.1	+1.2

Precipitation.—Precipitation was deficient in the great majority of districts; it was most pronounced in the north Pacific States, the Atlantic States south of Virginia, also in the Gulf region. There was more than the normal precipitation in the region stretching from southern Utah and southern Nevada northeastward to the Canadian border. Smaller areas of more than the average rainfall may be found in various parts of the country—Figure 2 and Table 2.